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# BASIC FEATURES OF FOREST STEPPE IN THE LOESS PLATEAU OF CHINA

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**ABSTRACT**: The Loess Plateau is situated at 33°43′—41°16′N, 100°54′—114°33′E. It is covered with 50—150m deep loess. As it is eroded by flowing water for a long time, it formed alone hill-gully topography. Humidity and heat decrease by degrees from southeast to northwest, the forest is replaced by the steppe, and an obvious transitional zone formed between them, it is forest steppe. Its characteristic is that stunted xero-mesophilous trees distribute sparsely on the meadow steppe, the meadow steppe mainly consist of xero-mesophytes and meso-xerophytes, the trees cover degree isn′t over than 20%, usually about 10%, sometimes below than 5%. A precipitation of about 420-520mm is a decisive factor of existence of the forest steppe in the Loess Plateau.

**KEY WORDS**: forest steppe, Loess Plateau, open forest steppe, meadow steppe

The types, characteristics and distributive law of the natural plant community are the natural law that reasonable layout of agriculture, forestry and animal husbandry should follow, and are the natural model in the region, it has real significance to the comprehensive transformation of the Loess Plateau and the restoration of ecological balance.

## I. GEOGRAPHIC POSITION AND CHARACTERISTIC OF THE LOESS PLATEAU

The Loess Plateau is situated at 33°43′—41°16′N, 100°54′—114°33′E., it includes seven provinces (autonomous regions), they are Henan, Shanxi, Shaanxi, Inner Mongolia, Gansu, Ningxia and Qinghai. The area is altogether 626, 800 square kilometers, occupying 6.5% of the territoty of China (Fig. 1)[1-4]. It is covered with 50—150m deep loess. The geographic feature is that the northwest is high and the southeast is low. As loess quality is loose friable, rich in



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From Zhu Yuemei's introduction, we can consider that the work done by the Women's Federation in different times has played an active role in raising women's social status and encouraging women to take part in community life.

## IV. CHANGES OF WOMEN'S ROLE IN COMMUNITY LIFE

### 1. Women's Role in Economic Life

There are a little more female employees than male employees in Renhe Town. There are 94 percent of female employees working in agriculture and industry, and they respectively accounting for 50.6 percent and 66.63 percent of all labour force of these two parts. Moreover, these two parts respectively made up 36.62 percent and 41.58 percent of gross countryside social production* in 1991[2]. Thus it can be seen that women play a very important role in economic development of Renhe Town. But not until the beginning of the 1980s, did women mainly participate in the collective agricultural labour assigned by their cadres. So women had not much chance to show their intelligence and wisdom. Since the policy of reform and open door to the outside world was carried out, women have had more and more chance to bring their abilities into full play. Though still only a few women can be leaders now, many women have become capable persons of different trades and professions. The following are some examples.

#### 1.1 *Women in industry*

There are more than 400 industrial factories in Renhe Town, and most factories produce shoes, clothing, electronic cell and plastic articles. Most of the workers in these factories are women. Though chief leaders are mainly men in most factories, women leaders do remarkable work in some plants. Taking Xing Hua Leather Articles Plant as an example, it originally belonged to town goverment and was contracted by a Hongkong bussiness man in 1980. Since then, the boss has been in charge of the plant's raw material supplying and product selling, but nearly all routine work has been dealt with by Ms. Yang, Vice Director, employed by the boss in 1980. Now, the plant has about 250 employees, among them, only 4 porters and one maintenance worker are men and all others are native women. Because most of them come from the peasant families, in their busy farming seasons, the plant has to reduce order forms so that workers can go home to do farm work. If order forms can not be reduced, Ms. Yang will tell the

* Gross countryside social production does not include the production value of the enterprises which are located in Renhe Town but don't belong to the town.


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consists of xero-mesophytes and meso-xerophytes. 4. The deciduous *Quercus* forest may stretch to the north along the gullies, and into the forest steppe zone. The plant community of typical steppe may also stretch to the south along the dry hill-ridges, and into the forest zone. So a space of contact has formed in the forest steppe of the Loess Plateau, the types of plant community are very complex (Fig. 2).

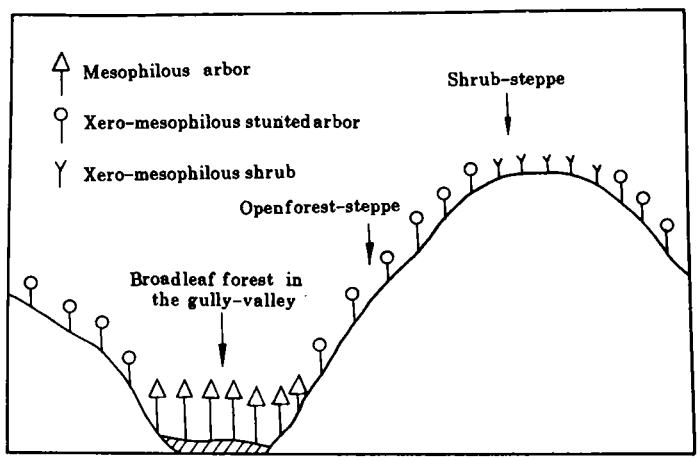


**Fig.** 2 The sketch map of the phytocoenosium distribution

Fig. 1 indicates that forest steppe is a narrow long zone in direction from northeast to southwest, it is 30—120 kilometers wide and 940 kilometres long. The average annual temperature of the zone is 6℃—10℃, usually 7.5—8.5℃; the average annual precipitation is 400—550mm. The contour of the forest steppe is decided by decrease of the precipitation from southeast to northwest. The approximate precipitation of 420—520mm is an important factor of the existence of forest steppe in the Loess Plateau. When the precipitation is less than 400mm, it belongs to the forest steppe; when it is more than 550mm, it belongs to the forest steppe; when it is more than 550mm, it belongs to the forest range.

As before the characteristic of the forest steppe is that stunted xero-mesophilous trees distribute sparsely on the meadow steppe, the meadow steppe mainly consists of xero-mesophytes and meso-xerophytes, the tree's cover-degree isn't over 20%, usually about 10%, sometimes below 5%. It does not play an obvious role in internal environment of the plant community, but herb's cover-degree usually is 3—4 times that of the tree, sometimes over 10 times. The cover-degree of shrub layer is similar to the tree layer, so the internal relative photo-intensity of the open forest steppe community is high, according to our observation, the internal relative illumination-intensity of the *Platycladus orientalis* open forest steppe community is 46.7%— 78.8%; the internal relative



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illumination-intensity of the *Pinus tabulaeformis* forest of wood-land is 17.96%—24.9%, and the *Quercus liaotungensis* forest is 5.0%—15.4%[5-7]. The high relative illumination-intensity is one of the main mark for the internal environment of open forest steppe community.

Since humidity, heat and air moving anew distribute because of hill-gully topography, the forest steppe zone is a complex space between forest and steppe, there are forests, open forest steppe, bush steppe and minor steppe community, the open forest steppe is the dominant type (Fig. 2). Shrub steppe and steppe communities distribute on hill-ridges, forest communities appear in the gullies. The stunted trees of open forest steppe communities are *Prunus armeniaca* var. *ansu*, *Ulmus macrocarpa*, *U. glaucescens*, *Juniperus rigida*, *Pyrus betulae folia*, *Prunus davidiana etc.*; dominant species of the herbs are *Artemisia giraldii*, *A. gmelinii*, *Lespdeza davurica* etc., they have marked the feature of forest steppe in the Loess Plateau. Constructive species of forest communities is *Quercus liaotungensis;* constructive species of secondary forest communities are *Betula platyphlla*, *Populus hopeienis*, *P. davidiana*. The steppe communities are dominated by *Stipa bungeana*, *S. grandis*, *Cleistogenes squarrosa*. Xero-mesophytes *Spiraea trilobata*, *S. mongolica*, *Rosa xanthina* and a few meso-xerophytes species of *Caragana*, such as *Caragana kansuensis*, *C. macrophylla*, *C. opulens* are representative.

We have counted the ecological types of *Platycladus orientalis* open forest steppe and *Juniperus rigida* open forest steppe, mesophytes, xero-mesophytes, meso-xerophytes and xeropytes are respectively 14.2%, 45.3%, 23.8%, 16.6% in *Platycladus orientalis* open forest steppe are respectively 27.0%, 35.5%, 14.1%, 23.0% in *Juniperus rigida* open forest steppe. These data marked the structural characteristic of ecological type of open forest steppe[5, 8]. According to our statistics, majority of young arborous stands can not be preserved in open forest steppe community, for example in 100m$^2$ of *platycladus orientalis* open forest steppe there are forty-six 0—10cm young stands of *Platycladus orientalis*, three 11—20cm young stands, One 21—50cm young stands on an average. In the early period, young arborous stands are more; in the later period, they are only a few, this is a universal phenomenon, but open forest steppe community will be more outstanding, the young stands can preserve only few, this is also a characteristic of open forest steppe community.

## III. REASONABLE OVERALL ARRANGEMENT OF AGRICULTURE, FORESTRY, ANIMAL HUSBANDRY

The above-mentioned feature of natural distribution of the plant community is the natural law that a reasonable layout of agriculture, forest and animal husbandry



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should follow, and is the natural model of shelterbelt project in the region. But for a long time, the people run counter to objective law, in the end, agriculture, forestry and animal husbandry had hardly developed[9], and the ecotope is deteriorated. Fig. 2 is the model of agriculture, forestry and animal husbandry layout, following this model people can change the condition and can restore ecological balance. The land on hill-ridges should be used for animal husbandry; the wide slope should be afforested with xerio-mesophytes open forests to conserve water and prevent soil erosion; land in the gullies should be cultivated while mesophilous arborous forest can be planted on both sides to protect the farm land and to be used as timber. In this way we can get mutual promotion among the agriculture, forestry and animal husbandry, and it may play an important role in the conservation of water and soil.

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